



SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026

SLOT: C1+TC1

Programme Name & Branch : B.Tech. Chemical Engineering
Course Code and Course Name : BACHY104 - Engineering Chemistry
Faculty Name(s) : Dr. Ethiraj KR, Dr. Atanu Chakraborty
Class Number(s) : 6416, 6422
Date of Examination : 19/08/2025
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s):

- **Answer All Questions**
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- **Course Outcome:**
 - CO-4: Explain water treatment techniques, corrosion types, corrosion mechanisms and protection methods.

QN	Question	M	CO	BL
1.	Discuss the principle involved in the estimation of dissolved oxygen in a water sample with appropriate equations. What are the methods to remove the dissolved oxygen from boiler feed water?	10	4	2
2.	What are the various filtration methods used for the disinfection of water, and how is reverse osmosis superior to all other processes? Discuss the principle and list out the advantages of the Reverse Osmosis process.	10	4	3
3.	(a) Calculate the calcium carbonate equivalence of the following impurities present in 1 L of water sample and find the temporary hardness present in the given water sample: CaCl_2 : 23mg/L, : MgSO_4 : 120mg/L, $\text{Mg}(\text{HCO}_3)_2$: 146mg/L, CaSO_4 : 34mg/L. (Mol wt. of CaCl_2 : 111, MgSO_4 : 120, $\text{Mg}(\text{HCO}_3)_2$: 146 and CaSO_4 : 136)	5	4	3
	(b) A small quantity of magnesium salts can create a large amount of boiler troubles. Give the reason behind this.	5		
4.	(a) Discuss the principle involved in the estimation of hardness by the EDTA titration method.	5	4	2
	(b) 1 g of CaCO_3 was dissolved in HCl and made up to 1 L for titration; 50 mL of this solution required 36 mL of EDTA, and 50 mL of sample hard water required 26 mL of EDTA. 50 mL of boiled, cooled water consumed 10 mL of EDTA. Calculate carbonate and non-carbonate hardness and express in ppm.	5		
5.	Compare the ion exchange resin method and the zeolite process for water purification. Highlight the differences in their working principles, <u>ion selectivity</u> , and regeneration method.	10	4	1
